

REMARKS

The pending independent claims have been cancelled and new claims 42-50, including new independent claims 42, 45, and 50 have been added. Reconsideration and withdrawal of the rejections is requested.

Responsive to the rejections at paragraph 5 of the 01/12/2006 Office Action, the application described backgrinding and plasma etching at 0046(f). These steps necessarily leave a bare silicon or uncoated surface. In addition, 0046(e) specifically mentions a bare silicon surface. Nevertheless, the terms "bare silicon" and "uncoated surface" are no longer included in the claims.

Relative to the rejections at paragraph 7 of the 01/12/2006 Office Action, claims 15-18 have been cancelled, and claims 20, 23, and 33-35 have been amended to provide antecedent basis and/or to more definitely describe the claimed method.

Turning to the double patenting rejections at paragraphs 10 and 11 of the 01/12/2006 Office Action, enclosed is an express abandonment of Application 10/975,194. The second double patent reference 2005-0236363 (11/127,052) has claims that are patently different from the pending claims. Claim 1, for example from 2005-0236363 reads:

"1. A method for polishing a wafer, comprising: spinning the wafer; creating a liquid film on the wafer; providing an etchant in the liquid film; directing a flow of an oxidizing gas to the wafer, with the flow interacting with the liquid film to polish the wafer."

None of the pending claims describes a flow of oxidizing gas interacting with a liquid film. Conversely, none of the claims in 2005-0236363 include HF. There are various other significant differences between the claims as well. At least for these reasons, the pending claims are not obvious over the claims in 2005-0236363.

New independent claims 42, 45, and 50 are supported at 0027 and 0036. These claims describe using HF to etch or remove a silicon dioxide layer, and using ozone to then oxidize (or continually oxidize) the silicon surface exposed by removing the silicon dioxide layer. Claims 42 and 50 describe backgrinding or plasma etching (discussed at 0046). These steps provide a bare or uncoated silicon layer. Claims 42, 45, and 50 all describe forming a liquid layer, and then controlling the thickness of the liquid layer. All of the claims describe a method for thinning a wafer. Claims 33-36 and 46-50 describe etch rates and thickness ranges that are consistent only with wafer thinning, as opposed to oxide removal or cleaning steps.

In response to the rejections at paragraph 13 of the 01/12/2006 Office Action, EP 782 177 discloses etching a wafer using HCl, HF, ozone, or mixtures of them, and water. The objective is to remove trace oxide (page 2, line 48). There is no suggestion of wafer thinning. EP 782 177 also makes no suggestion of any thinning related parameters, such as the etch rates or dimensions in claims 33-36 and 46-50.

Moreover, EP 782 177 does not disclose controlling a thickness of a liquid layer, as claimed. Controlling the thickness of the liquid layer is an important factor. While the anhydrous HF used in EP 782 177 will dissolve readily into the liquid (here water), ozone will not. If the thickness of the liquid layer is not controlled, the layer can act as a barrier to ozone. This would make any wafer thinning virtually

impossible to achieve, at least within any reasonable period of time. In the claimed methods, the thickness of the layer of liquid is controlled (to maintain a thin liquid layer). This allows the ozone to diffuse through the liquid layer to the wafer surface, where it oxidizes silicon. It also allows ozone that may be entrained in the liquid to contact the wafer surface. EP 782 177, in contrast, relies on dissolving a gas, such as ozone, into the liquid.

Since the purpose of the process in EP 782 177 is to remove trace oxide, this reference teaches away from the methods of claims 42 and 49. These claims include backgrinding or plasma etching. Hence the resulting wafer surface would not need any process for removing stray oxide, as in EP 782 177.

Turning to the rejections at paragraph 15 of the 01/12/2006 Office Action, Wong and Park appear to be merely cumulative of EP 784 177. The claims are consequently patentable over this combination for the reasons given above, i.e., the combination does not suggest an initial backgrinding or plasma etching step, or any step for controlling thickness of a liquid layer.

As for the rejections over the combination of EP 784 177, Wong, Park, Schrapfer, or Masumoto, the claims are of course not directed to backgrinding or plasma etching per se. Rather the claims are directed to methods for thinning a wafer, wherein an initial backgrinding or plasma etching step is performed, followed by chemical process thinning with HF and ozone. Schrapfer and Masumoto may disclose backgrinding, but they make no suggestion of a chemical process thinning, as claimed. EP 784 177, Wong, and Park may disclose wafer etching using HF and

ozone, but they do not suggest wafer thinning or a process including backgrinding or plasma etching.

In view of the foregoing, it is submitted that the claims are in condition for allowance. A Notice of Allowance is therefore requested.

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Application Number	10/975,194
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Examiner Name	Z. El Arini
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